

Mission Summary

Communications/Calibration Test Flight IFEX/RAINEX Mission Summary 050817I Aircraft: N43RF

Scientific Crew:

Lead Project Scientist s	Michael Black/Robert Rogers
Radar Scientist	John Gamache
Workstation Scientist	John Gamache
Observers/Guests	Andy Hagen (Penn State), Sonia Otero (HRD)
RAINEX Scientists	Bradley Smull (U. Wash.), Michael Bell (NCAR)

Aircraft Crew:

Pilots	Barry Choy, Mike Silah
Flight Engineers	Joe Klippel
Navigators	Pete Siegel
Flight Director	Barry Damiano
Engineers	Terry Lynch, Bill Olney

Mission Brief:

The purpose of this flight was to test communications, coordination, and perform an instrument comparison between N43 and the NRL P3. The communication tests included plane to ground transmission of flight-level serial and lower-fuselage (LF) radar data, electronic (XCHAT) communications between the aircraft, ground stations, and the NRL P3, and radio communications between aircraft. The comparison of flight -level instrumentation would come from formation (one plane trailing) flying in a box pattern at altitudes of 8,500 and 12,500 ft. and wind-Ls (2 orthogonal legs) at 12,500 ft. Comparisons of the tail radars on the NOAA and NRL P3s would take place adjacent to areas of convection that would be located during the flight. Additional communication tests to transmit real-time Doppler radar products and to upload and view special (compressed) hi-resolution satellite imagery using the HRD workstation were also planned. A takeoff time of 1800 UTC was planned from MacDill AFB with mission duration to be about 4 hours.

Mission Synopsis:

N43 took off from MacDill at 1757 UTC and headed west toward Buoy 42013, located at 27.16° N, 82.35°W, where the coordinated box patterns would be centered on. After some initial maneuvering to begin the coordination with the NRL aircraft, we started the box pattern at 183448 UTC heading south about 20 miles north of the buoy at an altitude of 8,500 ft. The aircraft flew a clockwise pattern around the buoy, ending the pattern on

a W-E leg at 1900 UTC. Winds were generally out of the east at 5-8 kts in this portion of the pattern. The aircraft climbed to 12,500 ft. and got in position to begin the 2nd box pattern on a N-S leg at 191117 UTC. This second box was finished on a W-E leg at 1935 UTC and flight-level winds here were out of the SE to SSE at 4-7 kt.

NOAA43 headed back over Buoy 42013 to drop 2 sondes nearly simultaneously, a new UBLOX sonde and an older GPS-121 sonde. The sondes were released at 1941 UTC but the first (UBLOX) sonde failed, having no launch detect. We circled and flew back over the buoy at 1949 UTC to release another UBLOX sonde, which worked.

The aircraft (both NOAA and the NRL) then stayed at 12,500 ft. to begin the coordinated wind-L with legs of ten-minute duration (~ 40 nmi). At 1954 UTC, N43 first flew downwind (tracking 335°) with the NRL P3 trailing about 4-5 miles behind. The second leg was flown on a cross-wind track from 1954-2010 UTC.

After some discussion among scientists on the aircraft and on the ground (via XCHAT), the two aircraft headed back toward the Florida Peninsula about 100 miles north of Tampa to fly adjacent to a line of convection that was developing along the sea-breeze front just inland. At 2050 UTC we began a S-N run along the west side of a series of mature convective cells along the sea-breeze front. The NRL P3 flew in tandem a few miles behind N43 and once both aircraft cleared the convection we turned around to perform a reciprocal track (N-S) leg adjacent to the convection. This leg was flown from about 2110-2130 UTC.

Once clear of the main convective cells, we maneuvered around a series of smaller cells while heading back to MacDill where we landed at 2155 UTC. After landing we were held on the taxiway for about 40 minutes because of nearby lightning.

Successes and Problems:

N43 successfully transmitted flight-level and LF radar that was received on the ground. There were dropouts in both data streams, however, and the dropouts in the LF stream were particularly troublesome since it appeared to AOC technicians on N43 that the data were still being transmitted. A recommendation was made to have dedicated monitoring onboard and notification, when the stream fails, to the AOC data technician or engineer.

Plane to plane and plane to ground communications worked well, both via HF radio (Navigators) and via XCHAT (scientists and technicians). There were only a couple of short duration dropouts of the XCHAT communications on N43.

Real-time Doppler products from the HRD workstation were transmitted and received on the ground.

The special satellite imagery could not be uploaded because of communication protocol issues between the HRD workstation and the ground server.

Of the 3 sondes that were dropped, one of the two UBLOX sondes had a failed launch detect. All 3 sondes, however, could not be received in real time on the HRD workstation due to an unknown communication problem. The sondes were able to be electronically retransmitted to the workstation later in the flight. The sonde data were not transmitted from the aircraft because of the urgency of testing the real-time radar software. There were some minor dropouts in the flight-level data system but overall, the system worked well and the radar systems did not appear to have any problems. The radar data was recorded on a secondary source, an onboard server, thanks to the efforts of Paul Chang and Jim Carswell,

The overall coordination between the NOAA and NRL aircraft was excellent thanks to the skill of the flight crews, particularly the navigators.

Michael Black
8/23/05

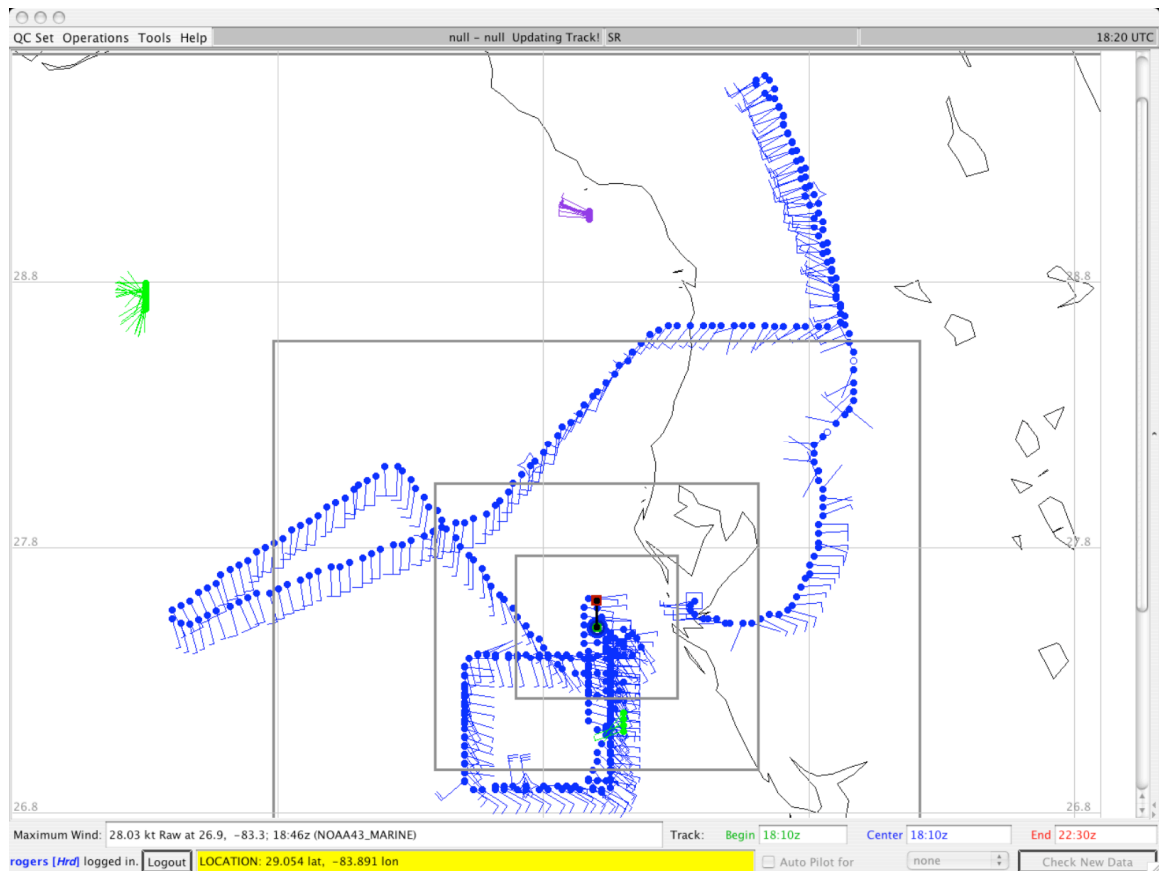


Fig. 1: N43 wind observations from flight level (blue), and a NOAA Buoy (green). The data are plotted in storm-relative coordinates from transmitted data using the HRD H*WIND analyses.

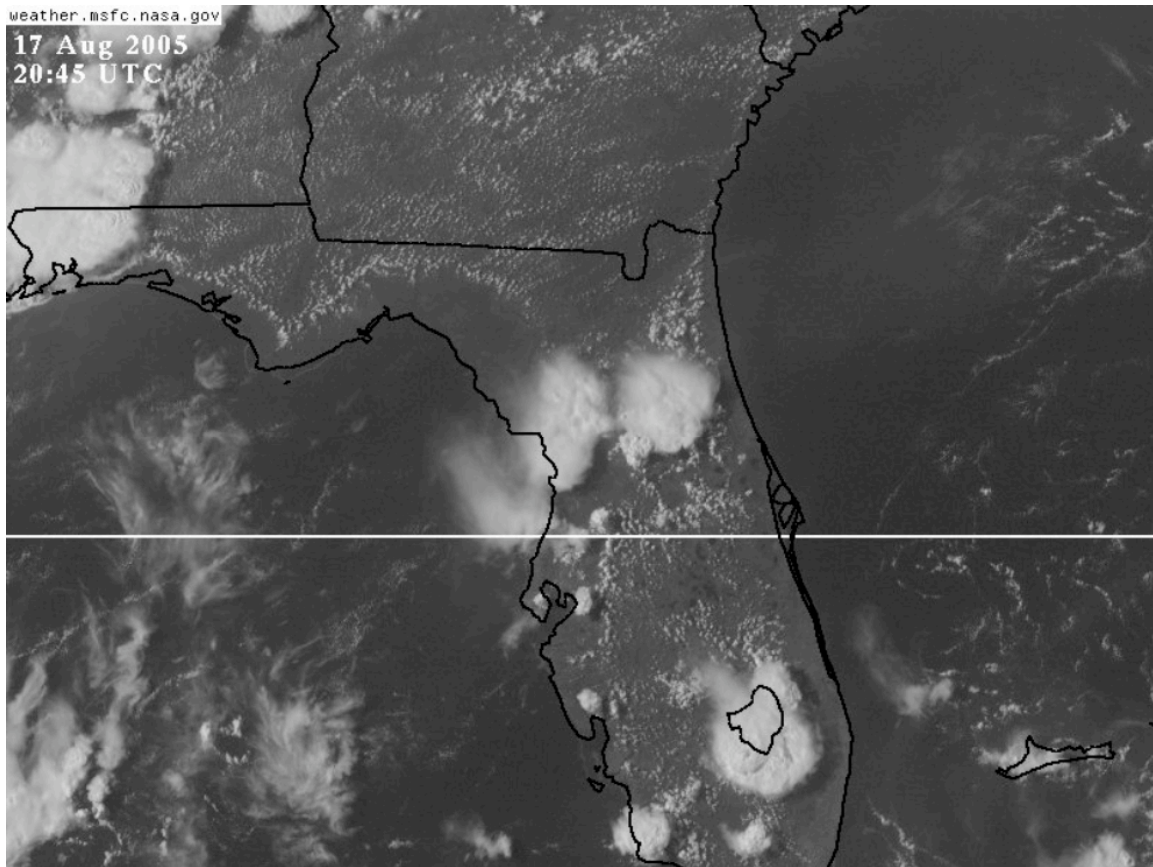


Fig. 2: Visible satellite imagery of convective cells north of Tampa at 2045 UTC 17 August.

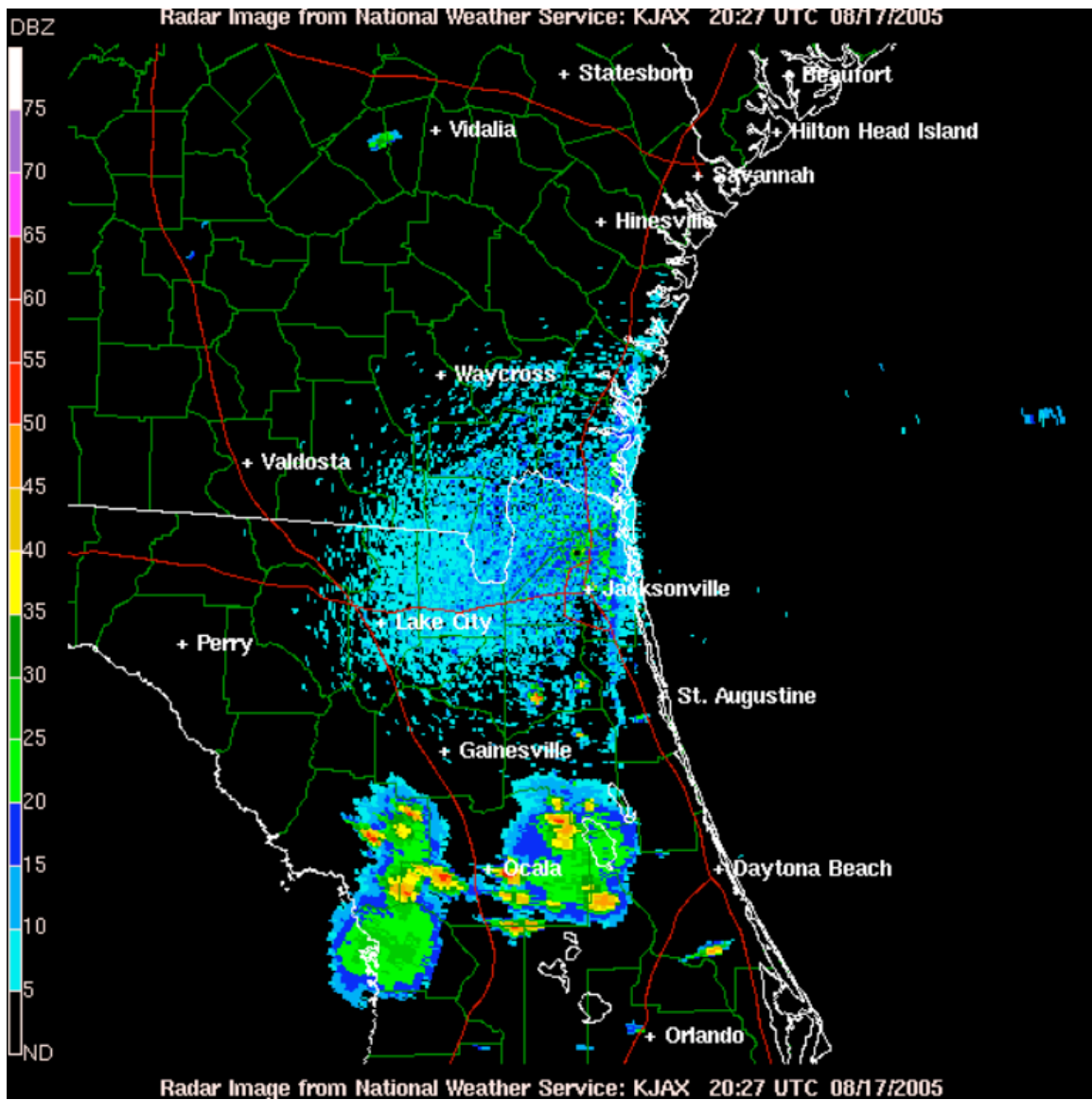


Fig. 3: Jacksonville, Florida WSR-88D radar image of the convective cells at 2027 UTC 17 August.



Fig. 4: Photograph of first convective cell flown (closest to west FL coast) as N43 approached the cell from the SW.